

II B.Tech I Semester Supplementary Examinations, November 2006
PULSE & DIGITAL CIRCUITS
 (Common to Electrical & Electronic Engineering, Electronics &
 Communication Engineering, Electronics & Telematics and Electronics &
 Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. The square wave shown in figure1 is fed to an RC coupling network. What are the voltage waveforms across R and across C if
 - (a) RC is very large, say $RC = 10T$ [8]
 - (b) RC is very small, say $RC = T/10$? [8]

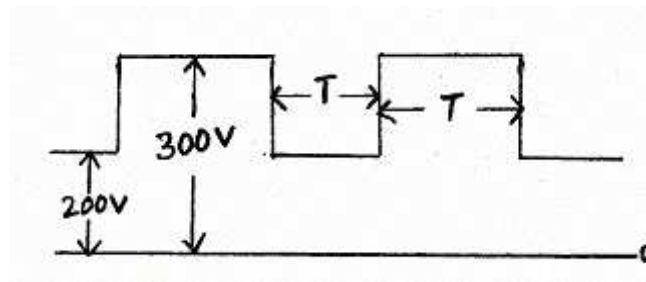


Figure 1

2. (a) Give the circuits of different types of shunt clippers and explain their operation with the help of their transfer characteristics. [8]
- (b) For the circuit shown in figure 2b below: Sketch the input and output waveforms. [8]

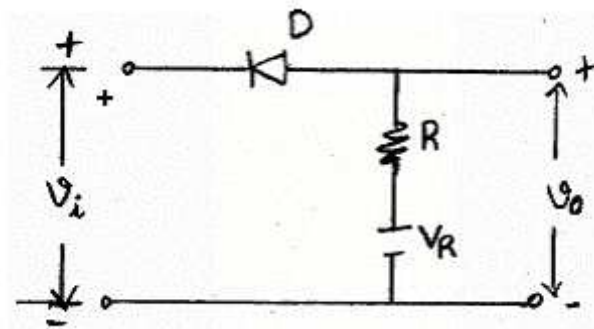


Figure 2b

$$V_R = 10V, V_i = 20 \sin \omega t$$

$$R_f = 100\Omega, R_r = 10K, V_\gamma = 0 \text{ and } R = 1K,$$

3. (a) Explain the behavior of a BJT as a switch. Give Applications. [8]
- (b) Write a short note on switching times of a transistor. [8]

4. A collector-coupled monostable multi using silicon n-p-n transistors has the following parameters:
 $V_{cc}=12V, V_{BB}=3V, R_{c1}=R_{c2}=1.8k\Omega, R_1=R_2=18k\Omega, h_{fe}=25, r_{bb'}=400$ and $C=1200pF$.
 Neglect I_{CBO} . Use $V_{CE}(sat)=0.2V, V_{BE}(sat)=0.7V$ and $V_r=0.6V$.
- Calculate and plot the waveforms at each base and collector. [12]
 - Find the overshoot. [2]
 - Find the output pulse width. [2]
5. (a) Bring out the necessity and importance of Time base circuits. [6]
 (b) In the UJT sweep circuit, $V_{BB} = 20V, V_{yy} = 50V, R=5k, C=0.01$ micro F. UJT has $\eta = 0.5$. Calculate
- amplitude of sweep signal
 - Slope and displacement errors and
 - estimated recovery time. [10]
6. (a) Illustrate the terms 'synchronization' and 'frequency division' of a sweep generator. [8]
 (b) A free-running relaxation oscillator has sweep amplitude of 100 V and a period of 1 msec synchronizing pulses are applied to the device such that breakdown voltage is lowered by 50 V at each pulse. The synchronizing pulse frequency is 4 kHz. What is the amplitude and frequency of synchronized oscillator waveform? [8]
7. (a) Illustrate with neat circuit diagram, the operation of unidirectional sampling gate for multiple inputs. [8]
 (b) Explain with circuit diagram the operation of a two input sampling gate which does not have any loading effect on control signal. [8]
8. What is meant by blocking oscillator? Explain the principle of operation of monostable blocking oscillator with base timing. Sketch the current waveforms and derive an expression for current pulse width. [16]
